Scott. II-27—104,006—4-11-40.

Dev (1952) Department.

MS SERIES.

G.O. NO. 2429

Dated 6.6.52

[Despatch Abstract.]

Industries — Sericulture — Research Station at Kollegal — Cytogenetical Studies — Experiments on induction of Polyploids — Research and Scope — Two Annexures — Sanction.

48/1/9

Department of Industries and Commerce.

94076

From:
SRI M.T. RAJU BAR-at-LAW, I.C.S.,
Director of Industries and Commerce, Madras.6.

To:
The Secretary to Government,
Development Department,
Fort St. George, MADRAS.9.

THIRD ASST. SECRETARY TO GOVERNMENT
28 AUG 1951
DEVELOPMENT DEPARTMENT

No.4059/D2/51 dt. 23.8.1951.

Sir,

Subject: Industries- Sericulture- Research Station at Kollegal- Cytogenetical studies- Research Microscope- Purchase of- Proposals.

In connection with Cytogenetical studies on mulberry, the Sericultural Research Station at Kollegal proposes to conduct experiments on "Induction of Polyploids" with a view to bringing about mutations in mulberry plants. In this connection, Government were pleased to sanction in G.O.Ms. No.2450 Development dated 30th May, 1951 the deputation of Sri K.N. Venkatesan, Pathology Assistant, to the Agricultural Research Station, Coimbatore, for advanced training in Cytogenetical work for a period of six months. The Sericultural Expert has now reported that for the conduct of the experiments, it is very essential to have a Research microscope, which will give sufficiently high manifestation for an effective study of Chromosomes. The cost of the Leitz B.S.T. Binocular Research Microscope, which is suitable for the purpose with spare eye-pieces and microscope lamps, giving a magnification of 4000 is expected to be about Rs. 4000/- based on quotation received from Messrs. The Scientific Instrument Company Limited, Madras. I agree with the Sericultural Expert that the provision of a research microscope is essential and I accordingly request that Government may be pleased to sanction an expenditure not exceeding Rs. 4000/- towards the purchase of a Leitz B.S.T. Binocular Research Microscope for the Sericultural Research Station at Kollegal.

2. The expenditure may be debited to :"43.a. Industries- and Supplies- Industries- F. Sericulture I -Ordinary areas- 2. Mulberry Cultivation".

for Director of Industries and Commerce

MNG/25:8/-

27/8

Missent
31.8.51

End.No.94076 MI/51-1 dt 31.8.51 ---- Dev(MI) Dept

Referred to the D.A., for remarks before

25.9.51.

30.8.51 30887

The D.A.

31/8/51

UNDER SECRETARY
66935
4-OCT 1951

Agriculture Department.

From
Sri M.S.Sivaraman, I.C.S.,
Director of Agriculture,
Chepauk, Madras.

To
The Secretary to Government,
Development Department,
Fort St.George, Madras.

ASST. SECRETARY TO GOVERNMENT
1951

L.Dis.X.1241/51 dt. 20.9.51.

105222

Sir,

Sub: Industries-Sericulture-Research station at Kollegal Cytogenetical studies-Research Microscope-Purchase of-Proposals - remarks offered.

Ref: Government Endorsement No.94076 MI/51.1 Development Department dt. 31.8.51. ¶ 1 above

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With reference to the Government Endorsement cited above, I submit the following remarks.

Microscopes of Zeiss Winkel manufacture of the latest types are available on the market for Rs.3000/- and less. These are quite suitable for the purpose of Cytological studies. Other equipments like chemicals microtome etc. are also required. A promision of a total sum of about Rs.5000/- may, therefore, be necessary. This could include a microscope costing not more than Rs.3000/- a simple rotary microtome, microscope lamp, paraffin oven and chemicals.

Sd.K.C.Naik
For Director of Agriculture.

/by order/

Gazetted Assistant.

NK 24/9
ss.21.9

36
19/10

Memo: 94076 M1/ST-3 d 18.X.57

Sub: Industries - Sericulture - Research Station at Kollegal - Cytogenetical Studies Research Microscope - Purchase of -

Ref: From the D.A., L.Dis X.1241/57 d. 20.9.57

The D.A. is requested to State before ~~30-10-57~~ 20-11-57 whether the experiments on "Induction of Polyploids" etc., may be carried out in the Agricultural Research Station at Coimbatore, with the existing equipment

To The D.A.

Note: F&A may see the draft memo before issue

No. 94076-M1/ST-2
1-10-57

2-6

Pendency (+ Deff)

The correspondence in the q. and the draft memo overleaf may be perused and the file returned to Desk. In the draft, I have suggested a small correction which Dev may consider

6.10.61

111263

F.A. No. 6335 Kl. St

11.10.61

Dev (M.) Deff

Note

The draft memo overleaf as amended by F & A Deptt may now issue

16.x.61

16.10.61

THIRD ASST. SECRETARY TO GOVERNMENT
1 OCT 1961

AGRICULTURAL DEPARTMENT.

127948

From

Sri M.S. Sivaraman, I.C.S.,
Director of Agriculture,
Chepauk, Madras 5.

To The Secretary to Government,
Food and Agriculture Dept.,
Fort St.George, Madras.

ASSISTANT SECRETARY TO GOVERNMENT
23 NOV 1951
DEVELOPMENT DEPARTMENT

No.X.2.1467/51 dated 17-11-51.

THIRD ASSISTANT SECRETARY TO GOVERNMENT
20 NOV 1951
FOOD AND AGRICULTURE DEPARTMENT

79828

Sub:- Industries - Sericulture - Research Station at Kollegal Cytogenetical studies - Research Microscope - purchase of.

Ref:- Government memo No.94076 M1/51-3 ~~Food~~ and Agriculture dated 18-10-51.

With reference to the Government memo cited above, I offer the following remarks.

"Induction of Polyploids" is an item of work which can only be done satisfactorily by a competent cytologist. There are two cytogeneticists at the Agricultural Research Institute at Coimbatore and they possess experience of the technique involved in the above work and also in the ~~explanati~~ exploitation of the knowledge secured by such studies. For inducement of polyploids and mutations, it is not enough if a high power microscope with accessories is provided. Such inducement is done either with the help of x-rays or chemical treatments or heat and cold shocks. A proposal to install an ex X-ray plant at the Agricultural Research Institute, Coimbatore has been recently negatived by Government in G.O.No.Ms.2035 Food and Agriculture Department dated 17-10-51. Till now the cytogeneticists at Coimbatore have been availing occasionally, the facilities available at the Bernard Institute of Radiology at Madras and at other Institutes such as at Bangalore for x-ray treatments. Chemical treatments have been and are being employed at Coimbatore itself, for which facilities are available at the ~~Ins~~ Agricultural Research Institute Coimbatore. Heat and cold shocks can also be imparted at the above Institute,.

2. The two cytogeneticists at Coimbatore have their programmes chalked out for them for 1950-53. Unless a detailed technical programme is drawn up for work on mulberry, indicating the objective and the extent of work involved, it is difficult to say if the two cytogeneticists can take up the additional work. If it is intended to merely apply the chemical treatments or heat and cold shock to a few subjects and note the effect, it may be possible to assign these duties to the two cytogeneticists.

SD/ M.S. SIVARAMAN.
for Director of Agriculture.

/By Order/-

dr/19.11.

Gazetted Assistant

(For MM)

Mis.part (Vide 2 above)
DEW VU

Plissue

Endt No. 94076 M1/51-4 dated 22.11.51
Referred to the DFSE for urgent remarks

2 Letters

Copy/Letter & Enclosures of 5th cited above

No. 4059--D2/51 d/18-1-1952. Department of Industries & Commerce, Madras.

8757
28-1-52

From
Sri M.T.Raju, Bar-at-law, I.C.S.,
Director of Industries & Commerce,
Mackays Gardens, Madras - 6.

To
The Secretary to Government,
Development Department,
Madras.9.

-v-v-v

11

14726-57

Agricultural Department

26996

From
Sri M.S.Sivaraman, I.C.S.,
Director of Agriculture,
Chepauk, Madras.

To
The Secretary to Government,
Development Department,
Fort St. George, Madras.

D.Dis.X.246/52 dated 7/3/52

SECRETARIAT TO GOVERNMENT
10 MAR 1952
DEVELOPMENT DEPARTMENT

Sir,

Sub: Industries - Sericulture - Research Section at Kollegal - Cytological studies - Research Microscope - purchase of - Remarks offered.
Ref: Govt.Endt.No.94076-M.I./51-5 dated 11/2/52 (Development Department).

Sri K.N.Venkatesan, Pathology Assistant, Sericultural Research Station, Kollegal has been given training by the Cytogeneticist, Agricultural College and Research Institute Coimbatore on the following items of work.

I. A full course in methods of handling materials for preparation for microscopical examination, especially for histological and cytological studies.

II. Preparation of slides of standard materials and with some practice in interpreting them.

III. Methods in collection of materials and of analysing them for cytological examination and hybridisation.

IV. Treatment of plant for production of polyploids.

2. He is now examining some of the preparations of root tips, flowers and ovaries of Morus species.

3. As soon as the Assistant returns to Kollegal after the completion of his training at Coimbatore, the Cytogeneticist thinks that the Assistant will be able to carry on the work and do such experiments as are needed for induction of polyploidy, if need be. His difficulty will, however, come in when he has to interpret some of the Chromosomal behaviours of the hybrids and their sterility. It is one of the problems of the Department to achieve a suitable leaf type, large enough, profusely bearing and resistant to mildew. For this, interspecific and intergracial hybrids are programmed. When such difficulties arise, the Assistant may seek the help of this Department.

4. I submit that for studying of Chromosomal behaviour, a Research microscope will be essential for the Pathology Assistant at the Sericultural Research Station, Kollegal.

Sd.K.C.Naik
For Director of Agriculture

/by order/

Gazetted Assistant

rk.3/3

Memo No. 94076 G.5½-6 dt 6-3-52. Dev. Dept.

Sub:— Industries — Sericulture — Research Station at Kollegal — Cytogenetical Studies — Research Microscope — Purchase of — ~~Proposals~~

Ref:— From the D.I.& C., Lr. No. 4059. D.2.57 dt 8.1.52

A copy of letter No. D.Dis.E.246/52 dt 7.3.52 from the D.A. is forwarded to the D.I.& C. His attention is invited to the D.A.'s letter No. L.Dis.X.1241/57 dt 20.9.57 Communicated with Govt. Endt. No. 94076 M.I-57-4 Dev. dt ~~20.9.57~~ 28.11.57. (Copy enclosed for ready reference)

The D.I.& C. is requested to offer his remarks on the purchase of ~~the~~ a microscope with Zeiss Winkel manufacture & of other equipments and materials referred to by the D.A. and to submit a revised estimate, if necessary. His report should reach the Govt. before 5.4.52.

Copy of PP this letter

To,

The D.I.& C.

with enclo. R.B.S.4.52 14.3.52 15.3.52 16.3.52

15

dev 48183 2-5-52

Industries & Commerce Department

From
Sri M.F.Raju, Bar-at-Law., I.C.S.,
Director of Industries and Commerce,
Madras.6.

To
The Secretary to Government,
Development Department,
Madras.

-c-c-c

16/

for the purch .e of a Zeiss Winkel microscope with the necessary equipments.

I solicit early orders of Government.

O.S. Retherein

for Director of Industries and Commerce

trs/ 1/5

1/5/52

Dev. (G) Dept.
*****

Sub;- Industries - Sericulture - Research Station at Kollegal - Cytogenetical studies - Experiments on "Induction of Polyploids" Research microscope - Purchase - Sanctioned.

Ref:- From the D.I.& C. No.4059 D2.51 dated 25-8-51.
From the D.I.& C. No.4059 D2.51, dt. 30-4-52.

G.O.Ms.No. 2429 dt. 6-6-52.

With a view to bring about mutations in mulberry plants, the D.I.& C. has proposed that experiments on " Induction of Polyploids" should be conducted at the Sericultural Research Station, Kollegal. The proposal of the D.I.& C. is accepted. Sanction is accorded to the D.I.& C. Madras to incur a non-recurring expenditure not exceeding Rs.4,500/-(Rupees four thousand five hundred only) towards the purchase of a Research Microscope of Zeiss Winkel manufacture with concomitant equipments for the Sericultural Research Station at Kollegal.

2. The expenditure should be debited to "43.a. Industries and Supplies - Industries-P- Sericulture I - Ordinary areas - 2. Mulberry cultivation."

3. A summary of the results of the experiments conducted should be submitted to the Govt. by 5-1-1953

To
The D.I.& C., Madras.
The A.G. Madras thro' Fin.
Copy to S.F.

CBE. 5-1-1953.

2.6.52

15/ Dev (G) Dept

Extracts from Call Book Register of 'G' Section

1. Serial No :- 25.
2. Date of entry in the Register :- 28-6-52
3. Subject :- Industries - Sericulture - Research station at Kollegal. Cytogenetical studies - Experiments on "Induction of Polyploids". Research Microscope - Purchase of - Sanctioned - Results
4. Gold current No :- 94076 G/51
5. No & date of G.O authorising the entry :- G.O M.S 2429 Dev 6-6-52
6. Date when further action is to be taken :- 5-1-53
7. Number and date of new current :- Dept Cri 2228 G/53 4/1/53

Dept: (G)

Memo No 2228 G/53-1 dated 9-1-53

Sub:- Industries - Sericulture - Research Station at Kollegal - Cytogenetical studies - Experiments on "Induction of Polyploids" - Research microscope - Purchase - Results of experiment - Report.

Ref:- GO Rt. No. 2429 Dept dated 6-6-52.

The attention of the D.D.I.C is invited to para 2 of the GO cited and he is requested to expedite his report called for therein.

8/1/53

8/1/53

To the D.D.I.C

R.D 29-1-53

2/1

Industries and Commerce Department

From
Sri M.T.Raju,Bar-at-Law.,I.C.S.,
Director of Industries & Commerce,
Mackays Gardens, Madras.6.

To
The Secretary to Government,
Development Department,
Madras.

No.69-D2/53. dated 29-1-1953.

Sir,

Sub: Industries -Sericulture - Research Station at Kollegal - Cytogenetical Studies - Experiments on Induction of Polyploids - Research Microscope - Results of experiments - ~~Results~~ Report

Ref: Govt.Memo No.2228-G/53-1 Dev., dated 9-1-53. p 2 above

In G.O.Ms.No.2429 Dev., dated 6-6-52 Government sanctioned the purchase of a Zeiss WinkelResearch Microscope to conduct experiments on Induction of Polyploids at the Research Station, Kollegal and called for a summary of the results of the experiments conducted. It is reported that the Microscope was received at Kollegal on 15-10-52 and that the integral illumination device was worked only after the receipt of 25 cycles transformer on 12-11-52. The following research work is reported to have been undertaken at the Research Station with the aid of the Research Microscope.

(1) Study of the microsporogenesis in Morus Indica Linn.

(2) Study of the megasporogenesis in Morus Indica Linn.

(3) Study of the microsporogenesis in the natural tetraploid Curdrania triloba

(4) Systematic study of the nature and shape of the Cystoliths in the leaf

(5) Karyological studies of the different species and varieties of mulberry.

(6) Experiments on induction of Polyploidy.

pp 5-6 below — I herewith enclose a report submitted by Sri N.K.Gururaj indicating in detail the nature and results of the experiments conducted on each of the above items and the work proposed to be taken up hereinafter.

for Director of Industries and Commerce

Encl: One Report.

trs/ 29/1.

31/1/53

Dev (G)

p 17 of (K) — Submitted for perusal
May be filed with G.O.Ms no 2429 Dev dated 6.6.52

2 at (K)
6/4/53

7/4/53

23/ 8/

Copy of report dated 18-12-52 received from the Assistant Sericultural Expert(MR)Kollegal by the Sericultural Expert, Kollegal.

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Sub: RESEARCH STATION, KOLLEGAL- Purchase of a Research Microscope -

P174 (K) — Ref: G.O.Ms.No.2429 Dev. dated 6-6-52 with endorsement No.2457 B1/51 dated 25-6-52 of the Sericultural Expert, Kollegal.

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The sanction for the purchase of the Research microscope with concomitant equipments for the Research Station, Kollegal was accorded in June 1952.The Ziess Winkel new model "Standard" Binocular Research microscope G.F.525 was received on 15-10-52 while the integral illumination device could be worked only after the receipt of the 25 cycles transformer on 12-11-52.Other appertenances like the higher maginifications viz., compensating eye-pieces K 20 x and K.30 x were received only on 4-12-52.

With the aid of the Research Binocular microscope recently purchased, the following research work was undertaken:-

1) The study of the microsporogenesis in Morus Indica Linn:- the local variety of Mylberry:-

Nearly about 60 slides of smears of pollen mother cells were critically examined under higher magnifications. Pollen-mother cells revealing the different stages of the hetero and homotypic divisions stained in Aceto-carmine were examined and with the Abbe apparatus as well as the Drawing mirror drawings were made. The phenomenon of secondary association or approximation of bivalents during the metaphase I, in the pollen mother cells was worked out and the diagnosis stage with the characteristic bivalent formation was also critically examined. Permanent slides prepared for the study of the development of the microspores stained in Gentian Violet and Iron Haematoylin were also examined and relevant details of observations recorded.

2) The study of the megasporogenesis in Morus Indica Linn:-

About 70 slides prepared out of the fixed materials of the developing ovule were examined under higher magnifications for the study of megasporogenesis. Diagrams of the hypodermal archesporial cell developing to the megagametrophyte and uni-nucleate, binucleate mirror and integral illumination device available in the new Research microscope.

3) Several slides prepared indicating the process of fertilization of the egg cell in the ovule, development of the pro-embryo from the fertilized zygote, the early nuclear endosperm which later on becomes cellular by the inter-cell wall formation were critically examined and necessary camera Lucida drawings were mad

4) The study of the microsporogenesis in the natrual tetraploid Cudrania triloba -

Aceto carmine smear preparations of the pollen mother cells were also examined under higher magnifications and the following observations were recorded with necessary drawings:-

The normal and abnormal method of hetero and homotypic divisions resulting in the production of 60% fertile pollen grains were noticed. During the first metaphase, the congression of the bivalents was not uniform. One to three tetravalent chains were seen to occur during ~~diakinesis~~. Simila. other disturbances such as formation of bent spindles during the second division, unequal distribution during the anaphasic separation of the chromatids and the formation of dyad cells etc., were also recorded.

/p.t.o./

5) Systematic study of the nature and shape of the cystoliths in the leaf:-

Different collections of mulberry preserved for indentification purposes were taken up. Leaf bits of different regions were fixed and longitudinal sections were examined under the higher magnifications and diagrams with the help of the drawing mirror were made. This study has really helped in grouping up the differeht specimens species-war.

6) Karyological studies of the different species and varieties of Mulberry:-

The somatic chromosome numbers of the following were determined using the higher magnifications:-

Morus alba, Morus indica, Hakuso and Kaironezumi-gaeshi. Analysis of the Chromosome complement in each of the above mentioned was taken up. The morphology and mear length of the individial chromosomes in the complement were critically determined. Many other species and varieties in mulberry have also been taken up for this study

7) Experiments on induction of Polyploidy:-

The bud portion of the mulberry seedlings was treated with 0-4% Colchicine Lanolin paste and — Naphthalene acetic acid for inducing polyploidy in mulberry. In some cases, the stem portion was decapitated and the emulsion was applied to the callus formed. One of those plants treated has decidedly shown the effect of the intake of the drug. It is growing vigourously, with a foliage of double the size of the normal plants which is very coarse, thick, and hairy. Leaf peals both from the normal(untreated) and induced plant stained with 1% aqueous Eosin dye were examined with the help of the microscope to determine the variance in the size and frequency of distribution of the stomatal cells.

Work contemplated hereinafter:-

1) Several crosses with different species and varieties available have been made for evolving certain improved strains of mulberry. It is very essential to study the Karyotypes of the parents, the progency after the cross-each individual plant etc. These items of works have to be taken up with the present microscope.

2) The Microsporogenesis, pollen fertility etc., in some of the exotic varieties of mulberry which may be selected as parents for inter varieties and specific hybridisation work have to be studied in detail with the use of the present research Microscope.

3) Different polyploids, heteroploids, aneuploids, resulting from the interspecific hybridisation work taken up recently, have to be critically examined with this microscope of higher magnifications to determine their chromosome numbers, their morphology behaviour during mecosis etc.

4) Resulting polyploids from the experiments on induction of polyploidy have to be analysed and fertility has to be determined so as to effect crosses with the normal diploids for evolving certain economic races of triploids, for which the present research mocroscope is of immense value

During these months, the new microscope of the latest type purchased, has been giving very high resolving power and very good performance.

/ True Copy /

(G.No. 94076 G/51-1)

Dev. G. Defn

Sub: Industries - Sericulture - Research Station at Kollegal - Cytogenetical studies - Research Microscope - Purchase of - Proposals.

Ref. From the D. I & C.No.4059/D2/51 d. 23-8-51.
Endt. No.94076 MI/51-1 dated 31-8-51.
From the D.A. L.Dis. X.1241/51 dated 20-9-51.
Memo.No.94076 MI/51-3 dated 18-10-51.
From the D.A. No.X.2.1467-/51 dated 17-11-51.
From the D.I.& C No.4059-D2/51 dated 18-1-52
From the D.A. D.Dis.X.246/52 dated 7-3-52.
Memo.No.94076 G/51-6 dated 16-3-52.
From the D.I & C. No.4059 D2.51 dated 30-4-52.

In his reference No.4059 D2.51 dated 23-8-51 the D. I & C. requested Government to sanction an expenditure not exceeding Rs.4000/- towards the purchase of a Leitz B.S.T. Binocular Research Microscope for the Sericultural Research Station at Kollegal, to conduct experiments on 'Induction of Polyploids' with a view to bringing about mutation in mulberry plants. The remarks of the D.A. were called for, as to whether the experiments could not be carried out in the Agricultural Research Station at Coimbatore with the existing equipment there. The reports of the D.A. are at Pp.7 and 11 c.f. The D.A. has reported that the two Cytogenticists attached to the Research Institute have their programmes already chalked out for 1950-53 and ~~therefore~~ suggested that Sri K.N.Venkatesan, Pathology Asst. Sericultural Research Station, Kollegal, undergoing training at the Research Institute could carry out the experiments on completion of the training at Kollegal itself, that a research microscope will be essential for him at the Sericultural Research Station, Kollegal, and that in difficult cases he could seek the help of the Cytogenticist at the Agricultural Research Station.

The D. I & C. has stated that Sri K.N.Venkatesan has since rejoined duty at Kollegal after his training, that the type of microscope suggested by the D.A. would be suitable for the purpose and that a sum of Rs.4500/- may be sanctioned for the purchase of the microscope and the connected equipments.

~~Government considered whether~~ the proposal of the D.I & C. to purchase a Research Microscope + equipments for the Sericultural

(at a cost not exceeding Rs 4500/-)

Research Station, Kollegal, may be accepted. Subject to ~~orders approved~~, a draft order is submitted. F & A and Finance departments ~~may be~~ for ~~remarks, if any~~. acceptance of the draft order.

7.5.52

7/5/52

Food & Agl (K) Dept.

The notes of Dept. on Appl-2 above Dev. no. and the draft order, before may be perused and the file passed on to Finance.

10/5/52

10.5.52

THIRD ASSISTANT SECRETARY TO GOVT. MADRAS
10 MAY 1952
FOOD AND AGRICULTURE DEPARTMENT

Fin 28825

Fin (Regn) F.dA no. 28825 K/52
1.4.52

The draft order below may be accepted.

25.5.52

26.5.52

Dev. Dept.

The proposal in this file is to purchase a research microscope and equipments for the Sericultural Research station, Kollegal at a cost not exceeding Rs 4,500/-. The need for the microscope is explained in the note at 1 above. The draft order has been accepted by the F&A and Finance Departments. The file may now be circulated to H.M. (I & C) for approval of the draft order which explains the proposal.

Fin no. 36737/52-1
30.5.52
Dev 60352/52
31.5.52

ORDER SECRETARY
31 MAY 1952
DEVELOPMENT DEPARTMENT

31.5.52

31/5/52

36737
1 JUN 1952

4 JUN 1952
DEVELOPMENT DEPARTMENT

2.6.52

Y. Venkatachalam H.M. (I & C)

(Draft no. 2425 Rs 6